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|---|----------------|--|-------------------------------|----------------------------|----------------------------|----------------------------|------------------|---------|-------------------------|--------------------------|
| EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment | | Work Assignment Number 0-05 | | | | | | | | |
| | | <input type="checkbox"/> Other <input type="checkbox"/> Amendment Number: | | | | | | | | |
| Contract Number EP-D-14-032 | | Contract Period 09/16/2014 To 09/15/2019 Title of Work Assignment/SF Site Name Africa Megacity Partnership | | | | | | | | |
| Contractor INDUSTRIAL ECONOMICS, INCORPORATED | | Specify Section and paragraph of Contract SOW 2, 3, 7, 12, 14 | | | | | | | | |
| Purpose: <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Amendment <input checked="" type="checkbox"/> Work Plan Approval </div> <div> <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Incremental Funding </div> </div> | | Period of Performance From 09/16/2014 To 09/15/2019 | | | | | | | | |
| Comments: The work plan and cost estimate dated 6/29/2015 have been received, reviewed, and are hereby approved for 422 hours and \$63,965.97. No previously performed work shall be duplicated. | | | | | | | | | | |
| <input type="checkbox"/> Superfund | | Accounting and Appropriations Data | | | | | | | | |
| | | <input checked="" type="checkbox"/> Non-Superfund | | | | | | | | |
| Note: To report additional accounting and appropriations data use EPA Form 1900-69A. | | | | | | | | | | |
| SFO (Max 2) <input type="checkbox"/> | | | | | | | | | | |
| Line | DCN (Max 6) | Budget/FY (Max 4) | Appropriation Code (Max 6) | Budget Org/Code (Max 7) | Program Element (Max 9) | Object Class (Max 4) | Amount (Dollars) | (Cents) | Site/Project (Max 8) | Cost Org/Code (Max 7) |
| 1 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| Authorized Work Assignment Ceiling | | | | | | | | | | |
| Contract Period: | | Cost/Fee: \$0.00 | | | | LOE: 0 | | | | |
| 09/16/2014 To 09/15/2019 | | | | | | | | | | |
| This Action: | | \$63,965.97 | | | | 422 | | | | |
| | | | | | | | | | | |
| Total: | | \$63,965.97 | | | | 422 | | | | |
| Work Plan / Cost Estimate Approvals | | | | | | | | | | |
| Contractor WP Dated: 06/29/2015 | | Cost/Fee: \$63,965.97 | | | | LOE: 422 | | | | |
| Cumulative Approved: | | Cost/Fee: \$63,965.97 | | | | LOE: 422 | | | | |
| Work Assignment Manager Name Sara Terry | | | | | | Branch/Mail Code: | | | | |
| | | | | | | Phone Number 919-541-7576 | | | | |
| | | | | | | FAX Number: | | | | |
| (Signature) _____ | | (Date) _____ | | | | | | | | |
| Project Officer Name Carolyn Blake | | | | | | Branch/Mail Code: | | | | |
| | | | | | | Phone Number: 919-541-5256 | | | | |
| | | | | | | FAX Number: | | | | |
| (Signature) _____ | | (Date) _____ | | | | | | | | |
| Other Agency Official Name | | | | | | Branch/Mail Code: | | | | |
| | | | | | | Phone Number: | | | | |
| | | | | | | FAX Number: | | | | |
| (Signature) _____ | | (Date) _____ | | | | | | | | |
| Contracting Official Name Natalia Fisher-Jackson | | | | | | Branch/Mail Code: | | | | |
| | | | | | | Phone Number: 919-541-3564 | | | | |
| | | | | | | FAX Number: | | | | |
| (Signature) _____ | | (Date) _____ | | | | | | | | |

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|---|----------------|--|-------------------------------|
| EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment | | Work Assignment Number 0-05 <input type="checkbox"/> Other <input type="checkbox"/> Amendment Number: | |
| Contract Number EP-D-14-032 | | Contract Period 09/16/2014 To 09/15/2019 Base <input checked="" type="checkbox"/> Option Period Number | |
| Contractor INDUSTRIAL ECONOMICS, INCORPORATED | | Title of Work Assignment/SF Site Name Africa Megacity Partnership | |
| Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval | | Period of Performance From 09/16/2014 To 09/15/2019 | |
| Comments: THE WORK ASSIGNMENT INCLUDES 200 HOURS FOR PREPARATION OF THE WORKPLAN/COST ESTIMATE AND TO BEGIN THE WORK ASSIGNMENT. THE CONTRACTOR SHALL PROPOSE THE HOURS NECESSARY TO COMPLETE ALL TASKS. NO PREVIOUSLY PERFORMED WORK SHALL BE DUPLICATED. SEE ATTACHED SOW | | | |
| <input type="checkbox"/> Superfund | | Accounting and Appropriations Data | |
| | | <input checked="" type="checkbox"/> Non-Superfund | |
| Note: To report additional accounting and appropriations data use EPA Form 1900-69A. | | | |
| SFO (Max 2) <input type="checkbox"/> | | | |
| Line | DCN (Max 6) | Budget/FY (Max 4) | Appropriation Code (Max 6) |
| | | | Budget Org/Code (Max 7) |
| | | | Program Element (Max 9) |
| | | | Object Class (Max 4) |
| | | | Amount (Dollars) |
| | | | (Cents) |
| | | | Site/Project (Max 8) |
| | | | Cost Org/Code (Max 7) |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| Authorized Work Assignment Ceiling | | | |
| Contract Period: 09/16/2014 To 09/15/2019 | | Cost/Fee: LOE: | |
| This Action: | | | |
| Total: | | | |
| Work Plan / Cost Estimate Approvals | | | |
| Contractor WP Dated: | | Cost/Fee: LOE: | |
| Cumulative Approved: | | Cost/Fee: LOE: | |
| Work Assignment Manager Name Sara Terry _____ (Signature) (Date) | | Branch/Mail Code: Phone Number 919-541-7576 FAX Number: | |
| Project Officer Name Carolyn Blake _____ (Signature) (Date) | | Branch/Mail Code: Phone Number: 919-541-5256 FAX Number: | |
| Other Agency Official Name _____ (Signature) (Date) | | Branch/Mail Code: Phone Number: FAX Number: | |
| Contracting Official Name Natalia Fisher-Jackson NATALIA FISHER-JACKSON _____ (Signature) | | Digitally signed by NATALIA FISHER-JACKSON DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=NATALIA FISHER-JACKSON, dnQualifier=0000016076 Date: 2015.06.09 17:04:56 -04'00' (Date) | |
| | | Branch/Mail Code: Phone Number: 919-541-3564 FAX Number: | |

Statement of Work

- I. **Title: USEPA Africa Megacity Partnership**
Contractor Name: Industrial Economics Inc.
Contract #: EP-D-14-032
WA #: 0-05

II. **Work Assignment Manager (WAM):**

Sara Terry
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards (OAQPS)
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Alt. WAM:

Amanda Curry Brown
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III. **Background**

Urban environments are where people and pollution come together. These places require a concerted approach to mitigate exposure and health impacts. Some of the most challenging, and rapidly growing, urban areas are in developing countries where data, resources and capacity are limited, but health impacts of air pollution are significant. The goal of the project is to demonstrate the ability to assess air quality and implement air quality management programs in a representative developing city – Accra, Ghana – and to do so in ways that simultaneously achieve benefits for climate change. This will be accomplished using innovative tools and techniques based on those that have proven most effective for U.S. cities and states, and which can be adapted for use in a much different policy and technical context.

Working with stakeholders in each country, we aim to:

- Identify the air pollutants and emission sources that most contribute to poor air quality and are most likely to promote climate change.
- Develop a model integrated air quality action plan to reduce fine particulate matter (PM_{2.5}), including black carbon, and other key air pollutants (e.g., ozone, sulfur dioxide, nitrogen oxides) from identified sources. The model plan should be developed and documented with an eye toward developing a model for other African cities.
- Estimate the health, energy and climate impacts prior to, and after, implementing the air quality policies.

- Deploy effective communication regarding mitigation options and benefits to decision makers and the public using the air quality information.
- Assist country officials in determining next steps for mitigation project implementation and financing.
- Using the experience in Accra, develop an Integrated Air Quality Management Model for African Cities

IV. Description and Tasks

The WAM is authorized to provide technical direction in accordance with the contract. In accordance with the contract and as directed by the WAM, the Contractor shall provide all data (including software and programming code) obtained and developed under this work assignment. Data shall be delivered in complete form, in the media and format directed by the WAM. The Contractor shall work in close collaboration with EPA and the Stockholm Environment Institute (SEI) to complete the tasks outlined below.

In accordance with the contract SOW, the Contractor shall perform the following tasks:

Task 1: Kickoff and Planning Meetings

Within one week of the work assignment effective date, the Contractor shall attend a kick-off meeting with EPA's WAM and EPA technical experts to discuss the goals and strategy for completing the work included in this work assignment. The Contractor shall then prepare a work plan and associated cost estimate in accordance with the terms of the contract. The work plan and cost estimate shall include a preliminary schedule (subject to refinement based on Accra planning meeting) that completes all tasks and deliverables as agreed during the kick-off meeting.

Within three months of the work assignment effective date, the Contractor shall hold an initial kickoff meeting in Accra, Ghana to introduce the key members of the project team, review the scope of work to be performed under the Terms of References, and develop a project schedule and communication protocols. The goals and objectives identified by Accra stakeholders for the project shall also be reviewed and discussed. Target dates for key project milestones, future meetings and workshops shall be defined.

The kickoff meeting will include EPA experts/program managers as well as appropriate local, regional, and national officials.

Deliverables under Task #1

- 1a Kick-off meeting with EPA
- 1b Planning Meeting in Accra
- 1c Work plan

Task 2: Information Collection and Review

The Contractor shall conduct a comprehensive review of relevant documents and reports to better understand ongoing efforts undertaken in Accra and Ghana on air pollution control and to understand current air quality conditions in the country, region, and city; any relevant data gaps and resource and capacity needs; and any climate or energy projects and activities that would be expected to impact air quality. Information would come from a variety of sources, but include an assessment of data currently available in LEAP, BenMAP-CE, any current country climate action plans or Climate and Clean Air Coalition initiatives or action plans, and the Global Burden of Disease reports.

Once the Contractor and U.S. EPA better understand air quality conditions and challenges in Accra, the Contractor shall work closely with the EPA to identify best practices that are available to address the relevant conditions in Africa. These should be similar to some of the challenges identified in Accra. The best practices shall be chosen so that they:

- Address a diverse range of air quality challenges, and have potential for climate co-benefits
- Could reasonably be applied to local air quality challenges
- Address key sources relevant to the target city and/or region and best available technologies for controlling air pollution from these sources
- Have documented information and data on how application of the practice occurred, barriers to implementation, and cost benefit information to the extent available.
- Cover a range of mitigation measures, including policies (regulations, permits, emission standards, etc.), use of technology, monitoring, etc.
- Involve the development of or response to a policy, program, plan, or monitoring and assessment program, including potential financing mechanisms that might be available.

After compilation of the best practices, the Contractor shall present to the EPA and relevant local, regional and national officials the main findings of this review. They shall also demonstrate the relevance of the identified practices to some of the current challenges faced in Accra, with the intent of organizing a workshop (task 3) presenting those case studies and how they could be of relevance in planning for and mitigating air quality problems in the target city and/or region. The report should also determine what additional information is most needed better define the problem, identify emitting sources, and move toward emission reduction actions.

Working with EPA, the Contractor shall present compiled information to the country partners, and assist in-country staff to communicate the results of this assessment to key decision makers.

Deliverables under Task #2

- 2a Information Collection Review Report
- 2b Best Practices Report
- 2c Preliminary Workshop Plan

Task 3: Prepare for and Present Workshop on Key Components of AQM

Working closely with the EPA and building on an existing suite of AQM training materials, the Contractor shall design an AQM workshop curriculum that is responsive to the information gathered under task 2. The curriculum should provide a broad overview of AQM, but also spend more focused attention on key data and resources gaps. The material can use US examples and processes to the extent these can be applied, or adapted to apply, in the developing country context.

The Contractor shall work with the U.S. EPA to identify experts to provide this information. The Contractor shall prepare the workshop agenda and training materials in MS PowerPoint format and provide to meeting attendees in both hard and soft copy formats. The Contractor shall organize the training and provide all training materials and signage. The Contractor is not required to cover travel or per diem costs for workshop participants. Ghana EPA will be requested to provide free or low cost venue support. The appropriate local, regional, or national officials will identify senior level policy and technical staff to participate in the workshop. Additionally, one or more experts from the EPA may participate.

Once the curricula are finalized, the Contractor shall organize and hold a workshop in Accra. EPA experts/program managers, appropriate local, regional, and national officials, as well as selected participants from other African cities may participate in each of the workshops.

Deliverables under Task #3

- 3a AQM Workshop Curriculum
- 3b Workshop Planned and Delivered

Task 4: Collaborative Assessment of Target City Emission Sources and Mitigation Options

Working in conjunction with the EPA and appropriate local, regional, and national officials, the Contractor shall conduct a more detailed assessment of the conditions related to air pollution. This assessment shall build on EPA's scoping mission and initial information collection and review, and include the following:

- Meetings with environmental agencies in Accra to better understand their challenges related to air pollution. Those meetings will also involve conducting institutional and capacity assessments to help the Contractor better understand the agencies' technical abilities and capacity building needs to develop and implement an integrated air quality management plan.
- Meetings with relevant management and technical staff in Accra to better understand ongoing efforts to minimize air pollution. This will include understanding key successes and shortcomings of any ongoing programs and better understand current approaches, funding processes and constraints, technology and equipment being used.
- Meetings with the relevant management and technical staff in Accra to understand and evaluate the current permitting and licensing programs for major potential polluters.
- Meetings with other governmental and non-governmental entities to gather information on the main polluting industries and economic activities in terms of their contribution to the local and national economy.
- Identify what other actors are working in-country to support AQM and/or climate pollutant mitigation activities.

The Contractor shall develop a report based on those meetings and include recommendations for action by relevant agencies and partners.

Deliverables under Task #4

- 4a Detailed Accra Assessment and Recommendations for Action

Task 5: Developing Model Air Quality Management Plan

The Contractor shall work with the relevant local, regional, and national officials to assist Accra in preparing a model integrated air quality management plan (AQMP). This plan shall take into consideration the relevant characteristics of Accra and should include the necessary control measures, relevant laws and policies, optimum pollution abatement technologies and equipment, monitoring of effects, and methods for assessing progress.

The Contractor shall assure that the plan includes the following elements:

- Assess the current status of air pollution in Accra. Technical staff from Accra shall use technical guidance provided by the Contractor (e.g., environmental quality assessment methods, technology for monitoring and analysis of aerosols, pollutant speciation, and photochemical reaction) to compile and analyze recent PM_{2.5} ambient monitoring data, and any data on the composition of PM_{2.5} concentrations (e.g., sulfate, nitrate, organic carbon, elemental carbon, and other direct PM_{2.5}). Analyses should be presented in terms of annual average and 24-hour PM_{2.5} averages. In the absence of any existing reports, Contractor shall work with the appropriate local, regional, or national officials to estimate contributions to PM_{2.5} ambient concentrations from sources within and near to Accra. These estimates can be developed using air quality modeling or other techniques.
- Develop current (“baseline”) and projected (“future year”) emissions inventories. The Contractor shall provide technical guidance on compiling emissions inventories (including use of emissions factors, relevant models, and readily available inventory platforms) for the preparation of emissions inventories. Technical staff from Accra shall be responsible for developing the emissions inventories. The emissions inventory should include the key industries and sectors contributing to air pollution in Accra and key pollutants (e.g. PM_{2.5}, including black carbon, SO₂, NO_x, VOC and ammonia as well as CO₂.) The baseline inventory should include the most recent years available and could be drawn from existing local or regional inventories if available. The future year inventory should be a target year determined by the appropriate officials based on expected implementation of the air quality management plan and estimate emissions changes due to 1) reductions due to ongoing and existing regulations for the stationary, mobile and area sources in Accra, projected growth in emissions from existing and new sources, and reduction in emissions due to projected shutdown of existing sources. (Note: the baseline and future year inventories are necessary to conduct air quality, cost-benefit, and other analysis needed for the air quality management plan.) The Contractor shall also provide guidance on maintaining, managing and regularly updating the emission inventory if procedures do not already exist.
- Develop control strategy. Based on the identification of key source sectors, the Contractor shall identify the pollution abatement technologies and approaches to reduce emissions contributing to PM_{2.5} and other key air pollutant concentrations. Information on pollution controls can include capital costs of control technologies, operation and maintenance costs, time needed for installation, and overall cost per ton of pollutant reduced. The Contractor shall recommend air pollution prevention and controls chosen from the available measures, along with estimates of the total abatement of key pollutants after implementing the recommended measures. This recommendation would also identify the geographic region for implementation, outline the recommended steps (i.e., policies, regulations, guidance, etc.) for putting these measures in place, potential avenues for financing the recommended policies and programs, and include procedures for tracking progress and ensuring compliance with the measures and plan.

Deliverable Under Task #5

5a Draft Air Quality Management Plan

Task 6: Assessment of Climate and Health Benefits of Implementing Model Air Quality Management Plan

The Contractor shall conduct analysis to define the expected level of air pollutant, toxics and GHG emission reductions and air quality improvement that could be achieved with implementation of specified control

strategy options on key source sectors. This analysis shall evaluate potential air quality improvements from source emission reductions within and from outside Accra. Using this information, the Contactor shall guide technical staff from Accra in assessing the costs and benefits of achieving the plan objectives (versus a no plan/control scenario) using the BenMAP-CE tool (for health impacts assessment and valuation) or LEAP-SLCP benefit calculator and available cost models (for control cost estimation). The Contract shall coordinate with EPA and other relevant Contractors (who are working on the benefits calculator) to organize and conduct a training session on the benefits analysis tools for state, local or national technical staff, potentially including air quality and climate staff from the surrounding Africa region.

The Contractor shall work with in-country staff to develop appropriate communication plan with supporting materials regarding the results of this assessment, as well as relevant requirements (human and financial resources, technology costs etc.) to implement the AQMP strategies, to key in-country decision makers.

Deliverables Under Task #6

- 6a Climate and Health Benefit Assessment Completed
- 6b Communication Plan with associated materials

Task 7: Final Model for Integrated AQM Management in African Cities and Organize and Hold a Final Workshop

Once the air quality management plan for Accra is completed, the Contractor shall organize a final dissemination workshop. This workshop is intended to present the air quality management plan, as well as the documented model for action for other African cities. The audience for this workshop is local, regional, and national officials, as well as identified participants from outside Ghana, with a priority given to current Climate and Clean Air Coalition members.

This workshop will include a detailed presentation of the final developments of the air quality management plan, results of the assessments, including cost-benefits assessments, and a detailed presentation of the recommended steps for implementing the plan. In addition, EPA experts will participate in the final workshop to present relevant U.S. air quality management program and policy information.

Deliverable Under Task #7

- 7a Model for Integrated AQM Management for African Cities
- 7b AQMP workshop

Task 8: Final Report

The Contractor shall prepare and deliver to the EPA a substantive and comprehensive final report for all work performed under this work assignment. The final report shall be organized according to the above tasks and shall include all deliverables and documents provided to Accra.

Deliverable Under Task #8

- 8a Final Report

V. QA Requirements:

The Contractor shall identify or include references of where to find the quality assurance criteria that will be applied to the data used in this work assignment. The implemented quality assurance procedures, data sources (and data acquisition date), explanation of the appropriateness of the data for the intended use and other pertinent data qualifications shall be stipulated in all deliverables produced via this work assignment.

VI. Reporting Requirements:

The Contractor shall submit a detailed cost estimate within twenty calendar days of the effective date of this work assignment. The estimated cost shall include direct labor, overhead, consultant and subcontractor fee, other direct costs including travel, and estimated total fee.

The Contractor shall provide monthly progress reports in accordance with the terms of the contract. The Contractor shall submit work products in electronic as well as hard copy form. In addition, the Contractor shall deliver to the WAM each draft and final report in electronic format that is readable by windows-based word-processing (Microsoft Word 2003), graphics (Microsoft PowerPoint 2003), spreadsheet (Excel 2003), and database (Access 2003) programs. The Contractor shall also provide electronic copies of reports in PDF format.

During the period of performance of this contract, the Contractor shall inform the WAM immediately (by telephone and email) of any problem(s) that may impede performance, as well as corrective actions needed from the Contractor and the EPA to resolve the problem(s).

VIII. Deliverable Schedule

| Task # | Description | Approximate Due Date |
|--------|--|--------------------------------|
| 1a | Kick Off Meeting | Within 7 days of WA approval |
| 1b | Work Plan/Cost Estimate | Within 20 days of WA approval |
| 1c | Planning meeting in Accra, Ghana | Within 3 months of WA approval |
| 2a | Information Collection Review Report | TBD |
| 2b | Best Practices Report | TBD |
| 2c | Preliminary Workshop Plan | TBD |
| 3a | AQM Workshop Curriculum | TBD |
| 3b | Workshop Planned & Delivered | TBD |
| 4a | Detailed Accra Assessment and Recommendations for Action | TBD |

| | | |
|----|---|-----|
| 5a | Draft Air Quality Management Plan | TBD |
| 6a | Climate and Health Benefit Assessment Completed | TBD |
| 6b | Communication Plan with Associated Materials | TBD |
| 7a | Model for AQM Management for African Cities | TBD |
| 7b | AQMP Workshop | TBD |
| 8a | Final Report | TBD |

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